

## Evaluation of a Blood Glucose Monitoring System with Automatic High- and Low-Pattern Recognition Software in Insulin-Using Patients: Pattern Detection and Patient-Reported Insights

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### Abstract

#### **Background:**

This study aimed to evaluate the performance of a glucose pattern recognition tool incorporated in a blood glucose monitoring system (BGMS) and its association with clinical measures, and to assess user perception and understanding of the pattern messages they receive.

#### **Methods:**

Participants had type 1 or type 2 diabetes mellitus and were self-adjusting insulin doses for  $\geq 1$  year. During a 4-week home testing period, participants performed  $\geq 6$  daily self-tests, adjusted their insulin regimen based on BGMS results, and recorded pattern messages in the logbook. Participants reflected on usability of the pattern tool in a questionnaire.

#### **Results:**

Study participants ( $n = 101$ ) received a mean  $\pm$  standard deviation of  $4.5 \pm 1.9$  pattern messages per week ( $3.6 \pm 1.8$  high glucose patterns and  $0.9 \pm 1.3$  low glucose patterns). Most received  $\geq 1$  high (96.5%) and/or  $\geq 1$  low (46.0%) pattern message per week. The average number of high- and low-pattern messages per week was associated with higher and lower, respectively, baseline hemoglobin A1c ( $p < .01$ ) and fasting plasma glucose ( $p < .05$ ). Participants found high- and low-pattern messages clear and easy to understand (84.2% and 83.2%, respectively) and considered the frequency of low (82.0%) and high (63.4%) pattern messages about right. Overall, 71.3% of participants indicated they preferred to use a meter with pattern messages.

#### **Conclusions:**

The on-device Pattern tool identified meaningful blood glucose patterns, highlighting potential opportunities for improving glycemic control in patients who self-adjust their insulin.

*J Diabetes Sci Technol* 2013;7(4):970–978

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**Abbreviations:** (BGMS) blood glucose monitoring system, (FPG) fasting plasma glucose, (HbA1c) hemoglobin A1c, (HCP) health care professional, (SMBG) self-monitoring of blood glucose

**Keywords:** blood glucose monitoring system, diabetes, pattern analysis, self-monitoring of blood glucose

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